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E06B 7/14

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E1J JGH

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GB 2085951 A GB 2067635 A GB 0524253 A
EP 0063964 A2

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(54) Draining condensation from windows

(57) A window structure comprises a window frame (10), a window pane (12) and a moisture drain (20). The moisture drain (20) is arranged to collect moisture running down an interior side (12a) of the pane (12). Drainage apertures (11,18) extend through the frame and are in communication with the moisture drain (20), whereby the moisture is carried from the interior side of the window structure to an exterior side.

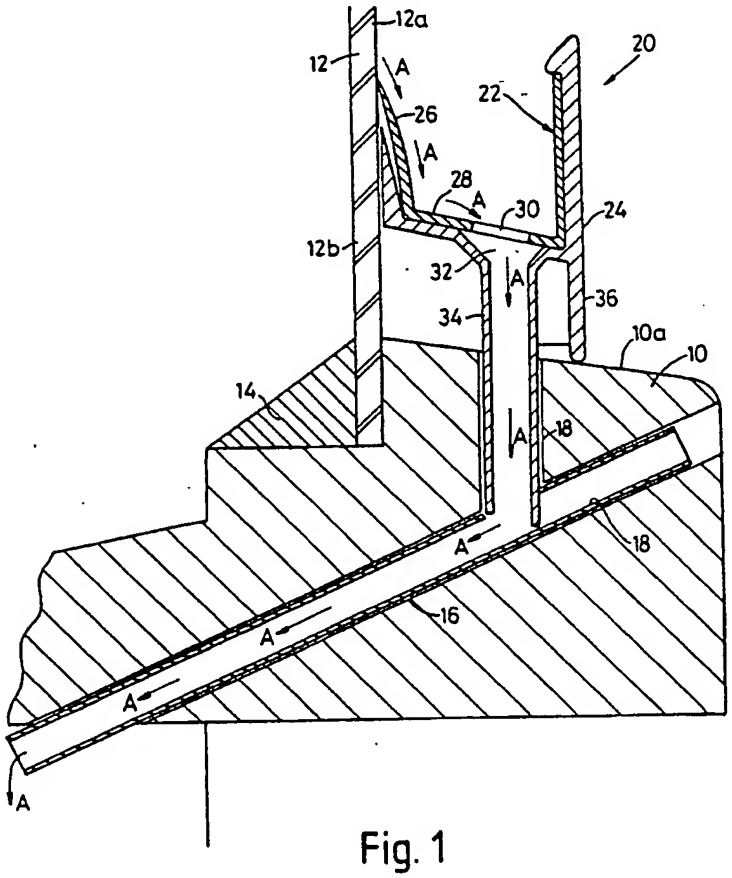

Fig. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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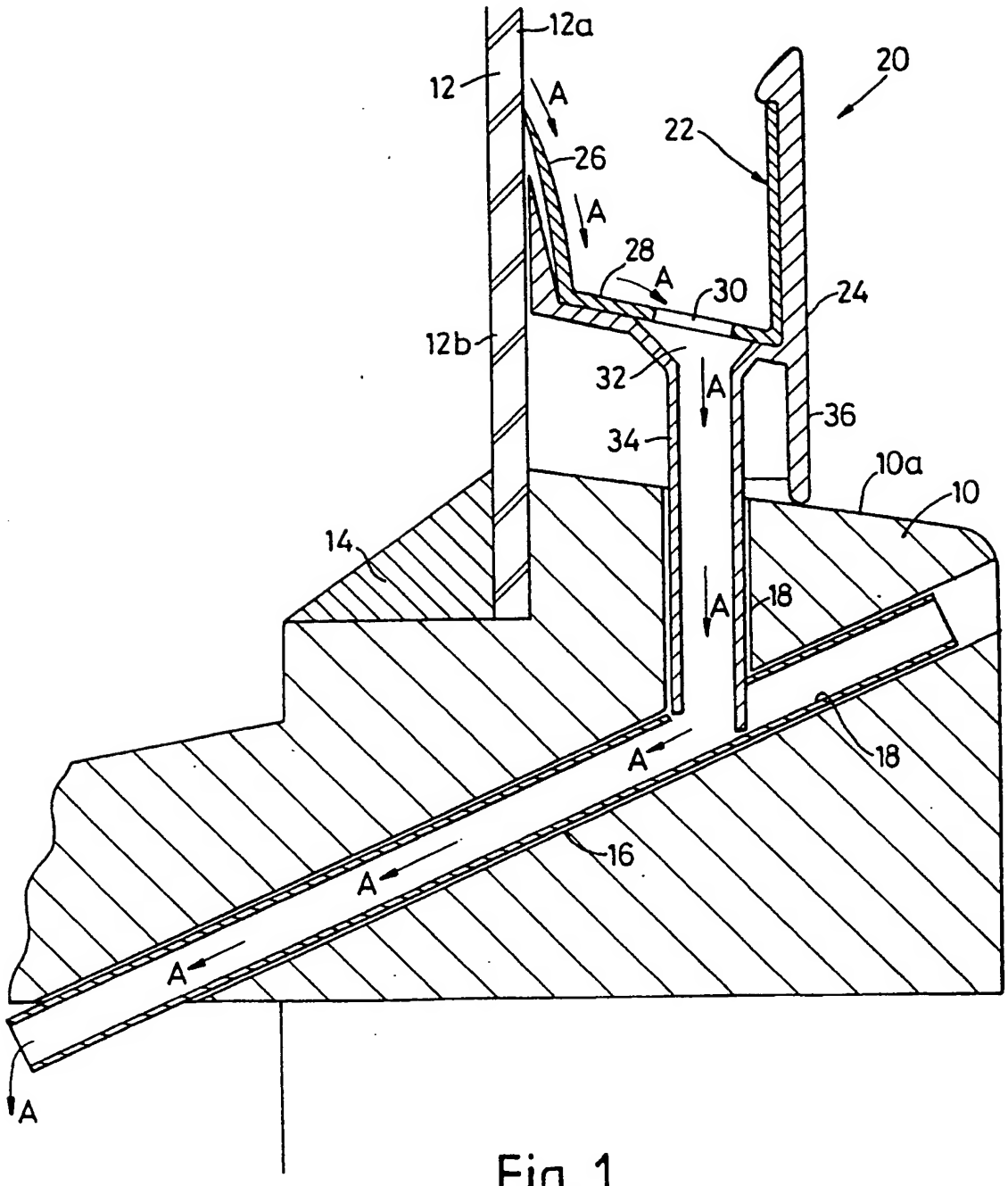

Fig. 1

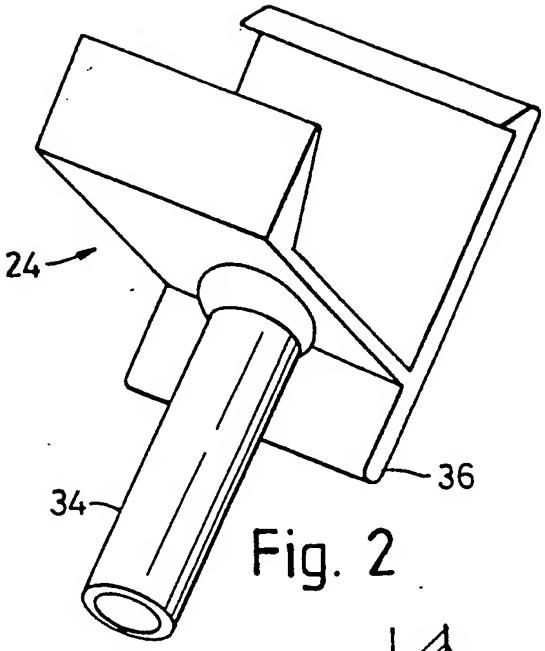

Fig. 2

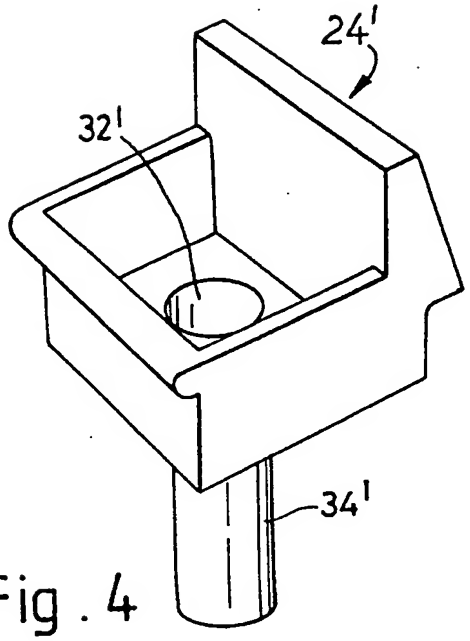

Fig . 4

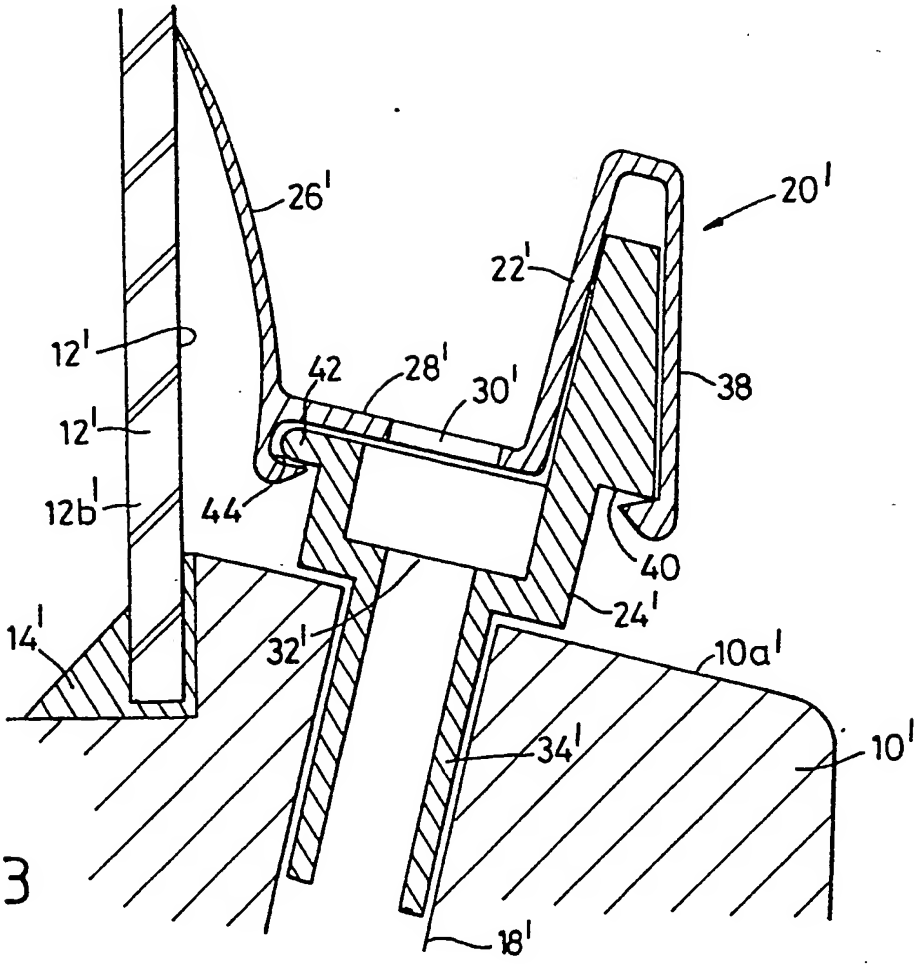

Fig. 3

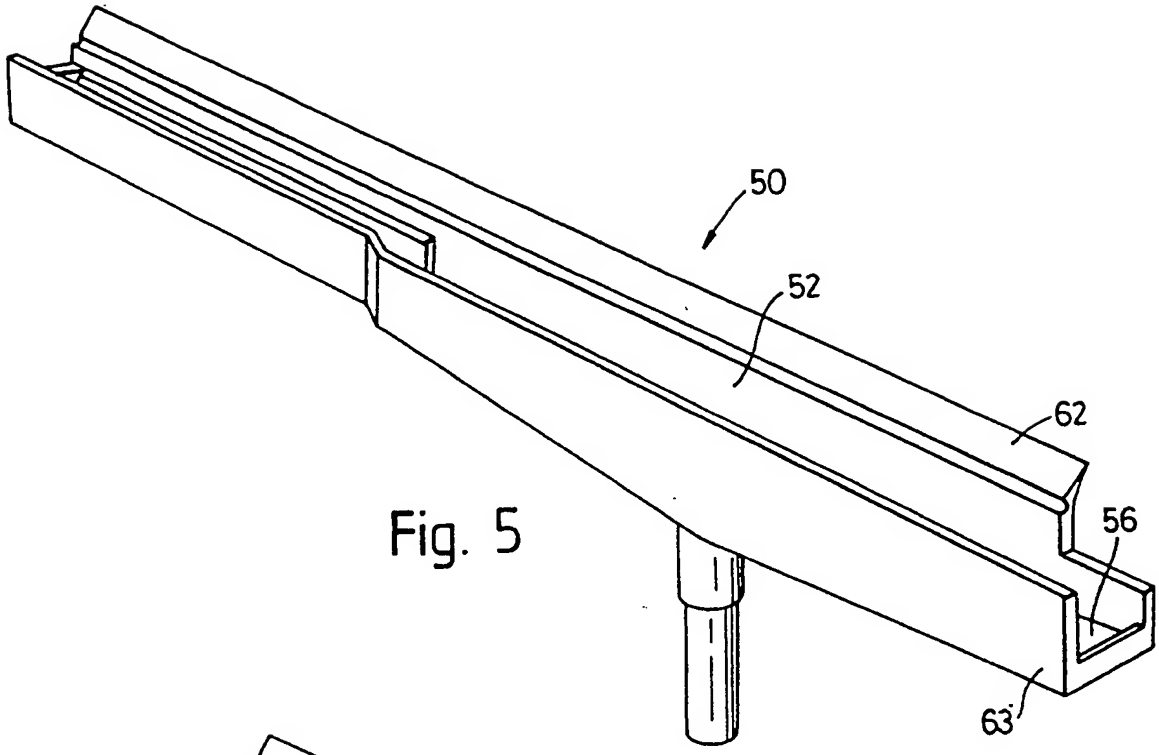

Fig. 5

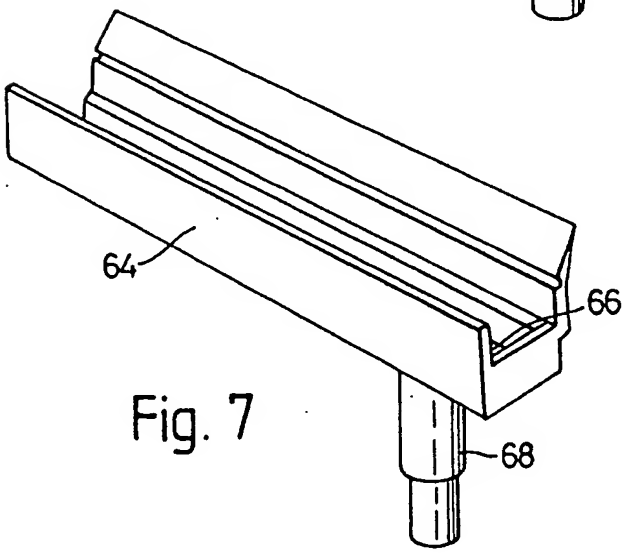

Fig. 7

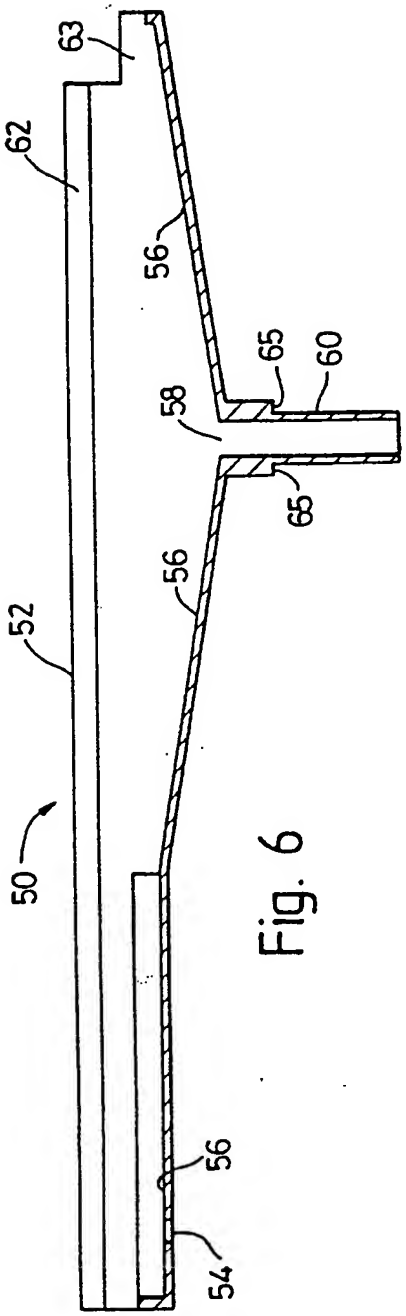
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Fig. 6

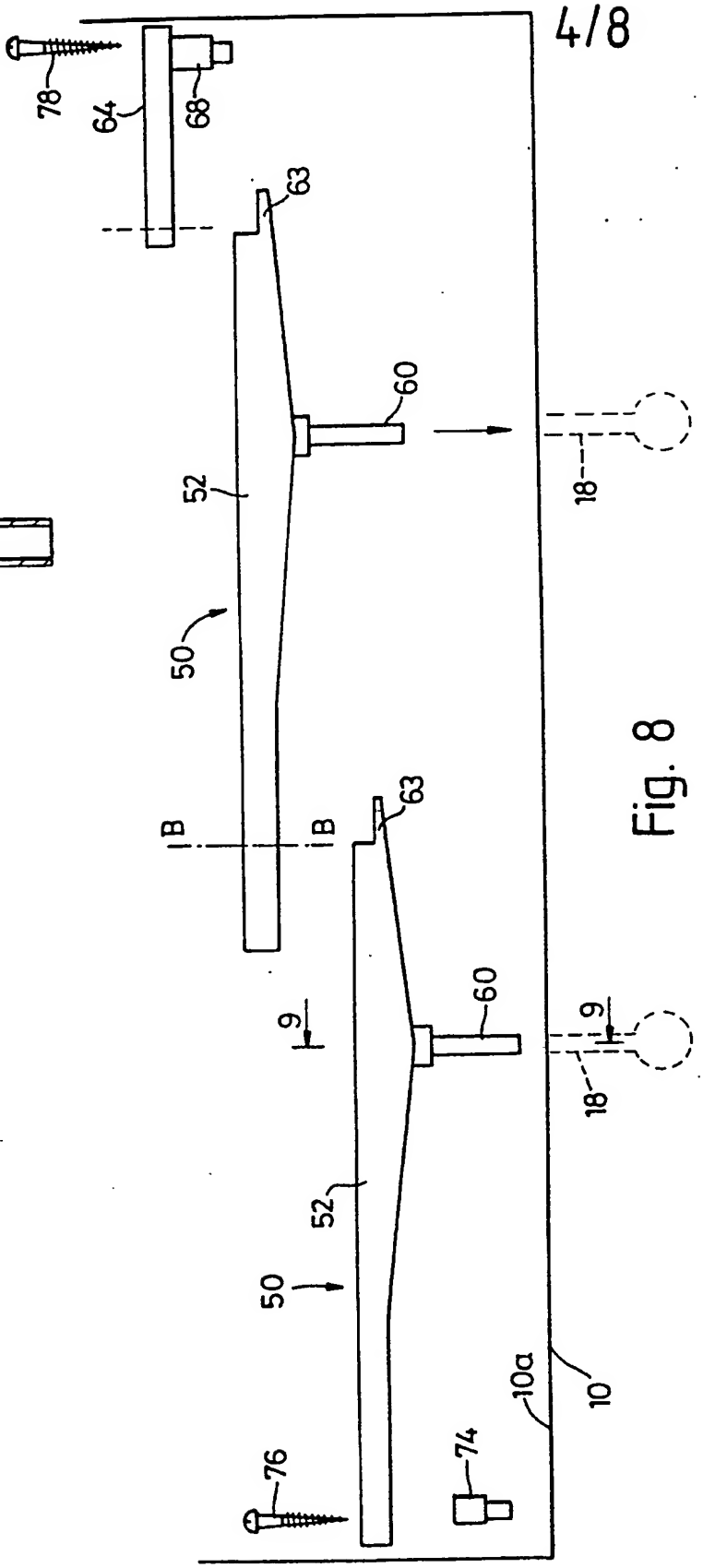

78
64
68
63
60
18
52
50
B
B
63
9
60
9
18
52
50
10a
10
76
74

Fig. 8

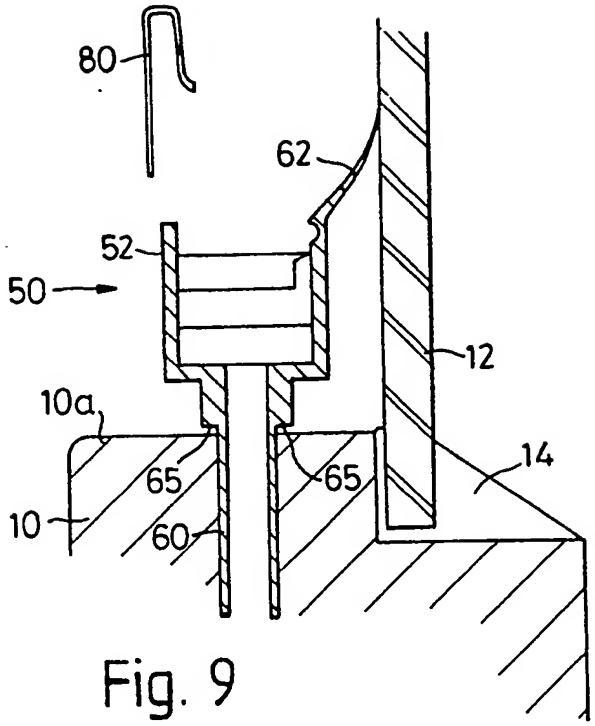


Fig. 9

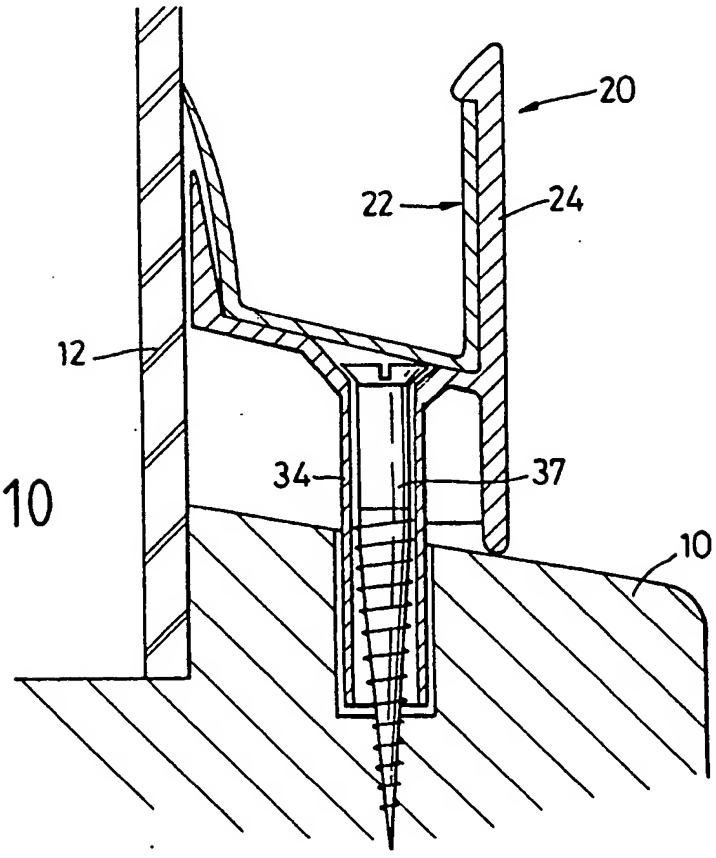
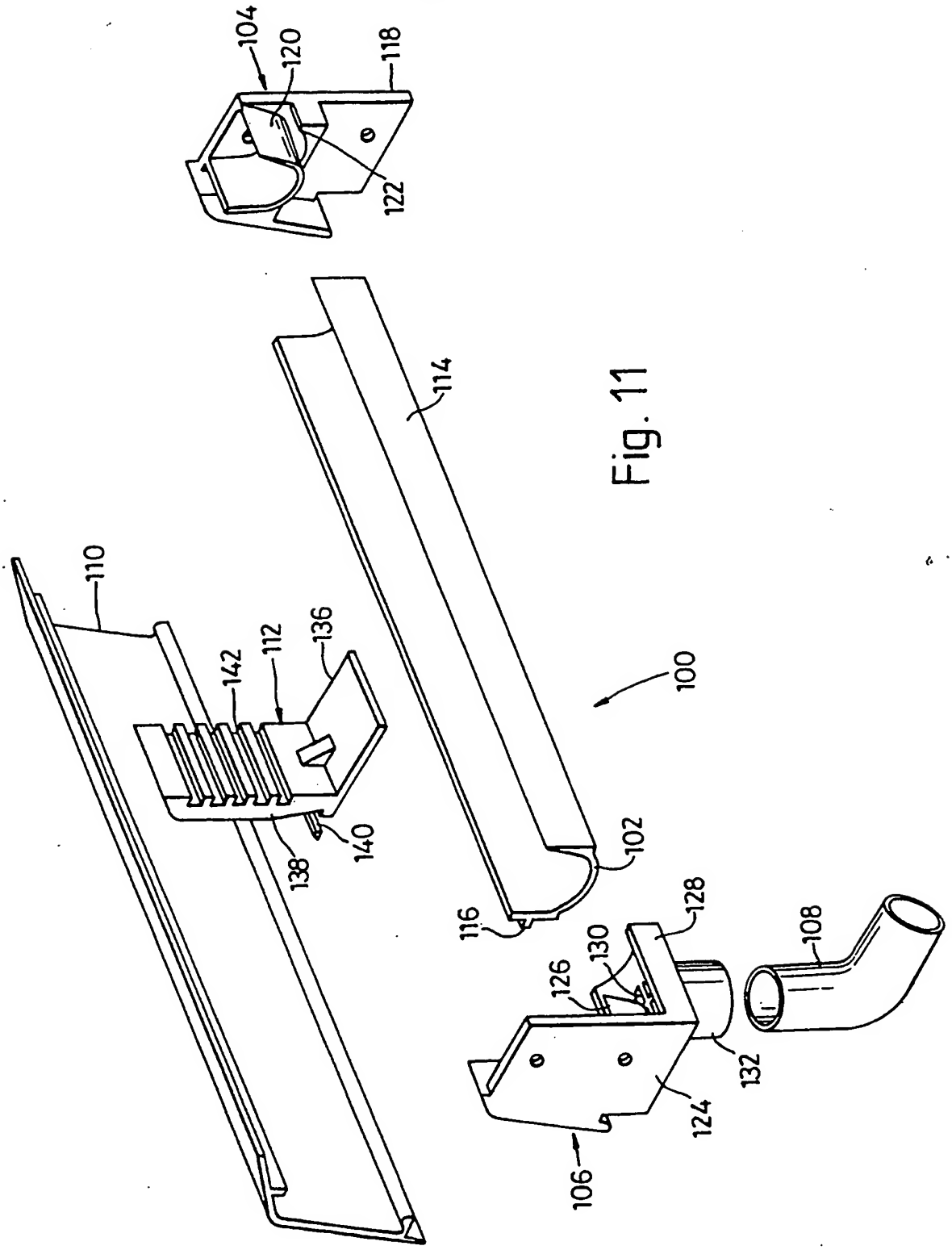


Fig. 10


104
120
118
122
114
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112
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Fig. 11

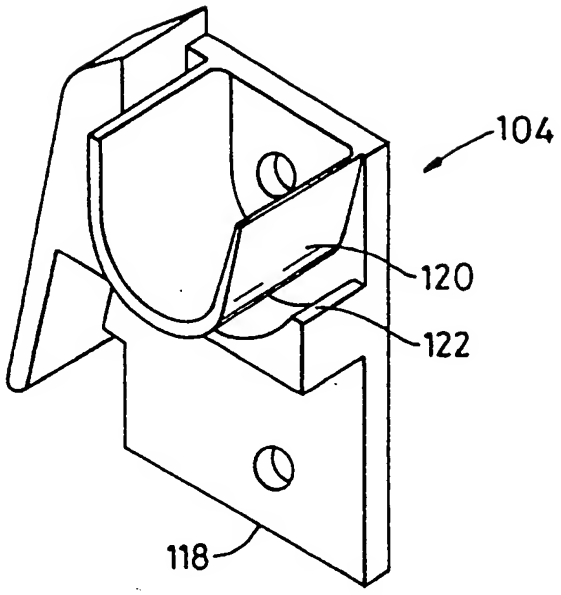

Fig. 12

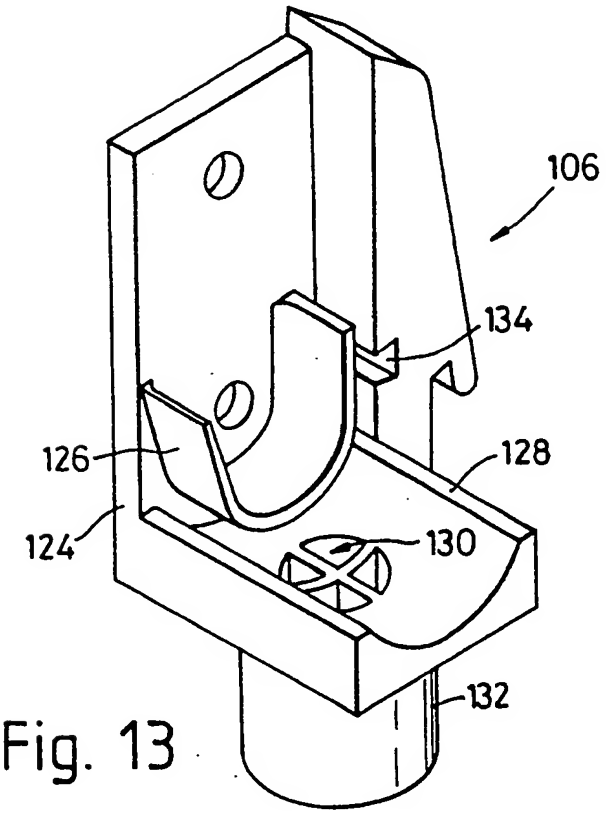

Fig. 13

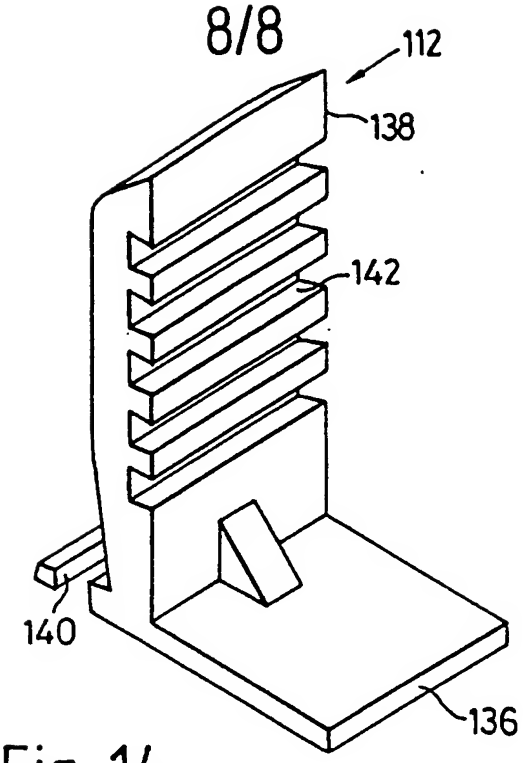

Fig. 14

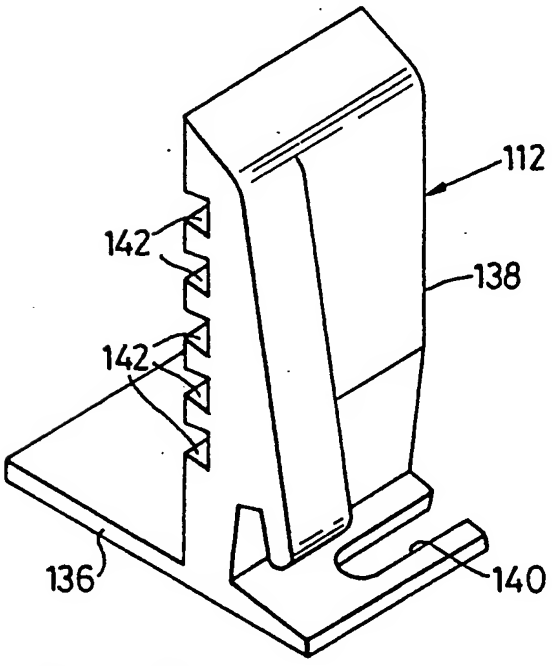

Fig. 15

IMPROVEMENTS IN THE MOISTURE DRAINAGE OF WINDOWS

This invention relates to improvements in the moisture drainage of windows. The invention particularly relates to a window structure, a method of providing a moisture drain in a window structure, and to a moisture drain per se.

Typically a window structure in a building comprises a frame disposed in an aperture in the building and a window pane surrounded by the frame. The frame may include an interior and/or exterior window sill.

There has long been a problem with condensation of water vapour on the interior side of the window pane. This condensation is caused by the temperature differential between the inside and the outside of the building.

The condensation runs down the surface of the window pane onto the window frame, where it can cause deterioration of the frame.

It is known to provide a condensation drain to collect moisture flowing down the interior side of the window pane and to deliver this moisture to the exterior

of the building structure.

One such condensation drain is described in GB-A-2105770. The drain described in this specification has the disadvantage that it is necessary to remove the window pane in order to fit the drain.

According to one aspect of the present invention there is provided a window structure comprising a window frame adapted to be received in an aperture in a building, a window pane disposed in the window frame, and a moisture drain, wherein the frame is provided with at least one drainage aperture extending from one side of the pane to the other side of the pane, and the moisture drain is in fluid communication with the or each drainage channel and is adapted to collect moisture flowing down the window pane, whereby said moisture is conveyed from the side of the window pane on the interior of the building to the exterior of the building.

The drainage aperture extends through the frame rather than between the frame and the window pane, thereby obviating the need for a complicated support and drainage structure between the frame and the pane.

Also, there is no need to remove the window pane during installation.

In its simplest form the moisture drain may comprise an elongate channel extending along a lower portion of the window pane, and having a portion in engagement with the frame so that the moisture runs into the channel. The channel may also have at least one aperture, the or each aperture being arranged in alignment with a respective one of the drainage apertures in the frame. Preferably the or each channel aperture is provided with a downwardly extending tube which can be received by the corresponding frame aperture.

In an advantageous construction the moisture drain comprises a moisture drain as described below with reference to the third aspect of the invention.

Desirably the or each aperture in the frame is provided with a lining tube which is preferably a plastics material.

According to a second aspect of the invention there is provided a method of providing condensation drainage in a window structure disposed in a building, the window

structure comprising a window frame surrounding a window pane, said method comprising forming at least one drainage aperture in the frame extending from one side of the pane, on an interior of the building structure, to the other side of the pane, on an exterior of the building structure, and providing moisture collection means in fluid communication with the or each drainage aperture on the interior of the building structure for collecting moisture running down the window pane, whereby moisture from the window pane is conveyed from the interior of the building structure to the exterior thereof.

Advantageously the or each drainage aperture is formed by creating a first bore hole in the frame extending downwardly from the interior side of the frame to the exterior side, and creating a second bore hole extending generally upwardly from the first bore hole to the interior side of the building structure. The moisture collection means can be in fluid communication with the or each second bore hole.

This method has the particular advantage that the condensation drainage can be provided on an existing window without the need to remove the window pane.

The drainage means advantageously comprises a moisture drain as described below with reference to a third aspect of the invention.

According to a third aspect of the invention there is provided a moisture drain for a window structure, comprising at least one elongate collection member adapted to extend at least partially along a window frame with a part thereof in engagement with the pane so that moisture flowing down the pane flows into the or each collection member, the or each collection member having at least one aperture in fluid communication with a drainage member adapted to drain the moisture from one side of the window pane to the other.

Preferably the or each collection member is channel shaped.

Advantageously the pane engaging part of the or each collection member is resiliently deformable so that said part can be biased into engagement with said pane; this helps to prevent moisture flowing between the pane engaging part and the pane.

The moisture drain according to the third aspect of the invention is particularly suited for use with the window described above with reference to the first and second aspects of the invention.

Preferably, at least one support member is provided which is adapted to support a respective one of the or each collection member at a position above the frame.

The or each support member is desirably adapted to cooperate with a respective one of the or each collection members to enable it to be secured to said respective collection members; preferably the or each support member is a snap fit with the respective collection member. Alternatively, the or each collection member may be integral with its respective support member(s).

In one embodiment at least one support member may be provided with an aperture which can be aligned with a respective one of the or each aperture in the or each collecting member. Further, said at least one support member may be provided with a tube extending downwardly from the support member apertures, said tube being adapted to be received by the drainage member.

Preferably the base of the or said collecting member slopes downwardly toward the apertures therein, so that the apertures are disposed at a lower part of the collecting member.

In practice, a plurality of said collection members may be arranged along the window frame, and to this end it is desirable that adjacent collection members are adapted to be arranged in overlapping relationship.

The moisture drain can be provided with a flexible drainage tube which extends into the drainage aperture; the flexibility of the drainage tube enables it to accommodate any bends in the drainage aperture. Since the tube can be made from a plastics material, it can be more resistant to degradation from moisture than the material of the frame, which would typically be wood.

The support member can, in an alternative embodiment, be positioned at any selected position between the ends of the channel, and, if desired, more than one support can be used. The support is preferably provided with a plurality of supporting positions; this feature is particularly useful, when the elongate channel slopes from one end to the other end therefore has a

varying height above the frame. The supporting positions are desirably formed by a plurality of substantially parallel recesses; the elongate channel can be provided with an elongate formation along at least part of one edge thereof, which can be received in one of the recesses.

Reference is now made to the accompanying drawings in which:-

Figure 1 is a cross-sectional view of a window structure according to the invention incorporating one embodiment of moisture drain;

Figure 2 is a perspective view of a support member shown in Figure 1;

Figure 3 is a cross-sectional view of another embodiment of moisture drain according to the invention;

Figure 4 is a perspective view of a support member shown in Figure 3;

Figure 5 is a perspective view of another embodiment of moisture drain according to the invention;

Figure 6 is a cross-sectional view of the moisture drain shown in Figure 5;

Figure 7 is a perspective view of an end-stop for the moisture drain according to the invention;

Figure 8 is a schematic view showing the way the moisture drain illustrated in Figures 5 to 7 is fitted to a window;

Figure 9 is a sectional view along lines 9-9 of Figure 8, taken after the moisture drain has been secured to the window;

Figure 10 is a cross-sectional view showing of part of the moisture drain of Figure 1 showing how it is secured to the window;

Figure 11 is an exploded perspective view of another embodiment of a moisture drain for a window according to the invention;

Figure 12 is a perspective view of a left hand end member for the moisture drain shown in Figure 11;

Figure 13 is a perspective view of a right hand end member for the moisture drain shown in Figure 11; and

Figures 14 and 15 are views from opposite sides of a support for the moisture drain shown in Figure 11.

Referring to Figure 1 a window structure comprises a substantially rectangular window frame 10 disposed in an aperture in a building structure, and a window pane 12 secured within the frame 10 by putty 14. The side of the pane 12 designated 12a faces the interior of the building structure, whilst the side designated 12b faces the exterior of the building structure.

The window structure is provided with a moisture drainage system for collecting condensated moisture running down the side 12a and conveying this moisture to the exterior of the building.

The steps in forming the drainage system are as follows. First, a hole 16 is drilled from the interior side of the frame 10 right through to the exterior side; the hole 16 is then fitted with a substantially cylindrical plastics liner 18 which is a close fit with the inner surface of the hole 16. The opening of the

hole 16 into the interior of the building structure may be provided with a plug or other seal. Second, a hole 18 is drilled substantially transverse to an upper surface 10a of the frame 10 on the interior of the building structure. The hole 18 is positioned such that it intersects the hole 16. The hole 18 is disposed in a row along the frame 10.

Third, a moisture drain generally designated 20 is fitted to the upper surface 10a of the frame 10 to collect and drain moisture running down the side 12a of the window pane 12.

The moisture drain 20 comprises an elongate plastics extruded collection member 22 which is supported by a plurality of plastics injection moulded support members 24.

The collection member 22 is substantially channel-shaped; a portion 26 of the collection member 22, which engages the side 12a of the pane 12, is resiliently

deformable so that it can be biased in engagement with the pane 12. A base 28 of the collection member 22 is provided with apertures 30 at intervals along its length. The hole 18 in the frame 12 should be drilled at a spacing which is selected so that one of the apertures 30 can be aligned with the hole 18.

The support members 24 (see also Figure 2) are arranged at intervals along the length of the collection member 22. The support members 24 are shaped to receive and support the collection member 22; the arrangement is such that the collection member 22 is a snap-fit with the support members 24.

Each support member 24 is provided with an aperture 32 in the base thereof, and a tube 34 extending downwardly from the aperture 32. As shown in Figure 1, the tube 34 is inserted into the hole 18.

An extension 36 on each support member 24 rests upon the surface 10a of the frame 10 and supports the support member 24 and collection member 22 on the frame 10.

In order to provide a secure arrangement some of the support members 24 can be secured to the frame 10

as illustrated in Figure 10. In this arrangement a screw 37 is inserted through the aperture 30 and 32 and through the tube 34 into the pane 10. The collection member 22 is inserted afterwards and covers the screwhead thereby hiding it from view.

It can be seen that moisture running down the side 12a of the window pane 12 will run onto the portion 26 of the collection member 22. The moisture then runs to the base 28 of the collection member into the apertures 30 connected to the hole 18. Subsequently the moisture drains through the tube 34 into the hole 16, and from there it can flow to the exterior of the building structure. The arrows A indicate the direction of moisture flow.

Figures 3 and 4 illustrate an alternative embodiment of moisture drain 20'. The components of the drain 20' shown in Figures 3 and 4 are similar to the components in Figures 1 and 2 and consequently components have been designated with the same reference numeral followed by a prime superscript. It will also be noted that the surface 10a' of the frame 10' is disposed at a larger angle to be horizontal than in figure 1. The hole 18' is drilled normal to the surface 10a'.

The principal difference between the embodiments of Figures 1 and 3 relates to the way in which the collection member 22′ snap-fits with the support members 24′. In Figures 3 and 4 an arm 38 extends down one side of the support members 24′ to engage in a recess 40. On the other side of the support members 24′ a projection 42 is provided which is received by a cooperating recess 44 in the collection member 22′.

A plurality of the collection members 24 or 24′ may be arranged along the length of the window pane 12 or 12′. However it is preferred to use only one collection member 22 or 22′ which is cut to the correct length.

Referring to Figures 5 and 6 an alternative embodiment of moisture drain is generally designated 50.

The drain 50 comprises an elongate channel-shaped collection member 52; the collection member 52 can be a plastics injection moulding.

A first aperture 54 is provided adjacent one end of the collection member 52 in a base 56 of the member. Part of the base 56 extends downwardly to a second aperture

58. An integral tube 60 extends downwardly from the aperture 58. The collection member 52 is provided with a resiliently deformable portion 62.The end of the collection member 52 remote from the first aperture 54 is provided with a cut away portion 63 which serves to receive an adjacent collection member 52 or an end stop member 64 (see Figure 7).

It will be noted that the tube 60 is provided with two portions of different diameters, thereby defining a rebate 65 at the adjoining positions.

Figure 7 illustrates elongate the end stop collection member 64 which, like the member 52, is channel-shaped and a plastics injection moulding. A base 66 of the collection member 64 is provided with an aperture (not shown) from which a tube 68 extends downwardly.

Figure 8 illustrates the way in which the moisture drain 50 is provided in the window shown in Figure 1. The leftmost collection member 52 is placed on the frame 10 and the tube 60 is inserted in the first of the holes 18. A tubular spacer 74 is provided between the first

aperture 54 and the upper surface 10a of the frame 10. A screw 76 is inserted through the aperture 54 and spacer 74 into the frame 10 to secure the collection member 52 to the frame 10.

The next collection member 52 is then arranged so that its tube 60 extends down the next hole 18. Also, if necessary this collection member 52 is cut along a cut line B-B so that it fits into the cut away portion 63 on the first collection member 52.

Finally the end stop collection member 64 is placed at the rightmost part of the frame 10 and a screw 78 is passed through the aperture in the member 64 and through the tube 68 into the frame 10 to secure the end stop collection member 64 to the frame 10.

It will be noted from Figure 9 that when the collection members 52 are in position the rebates 65 engage the upper surface 10a of the frame 10.

A cover strip 80 can be provided over the collection members 52 and 64, as shown in Figure 9.

It will be appreciated that the use of the separate spacer 74 enables the collection members 52 to be used either as a left end unit or as a middle unit.

Each of the members 52 are of the same size and shape and can be cut as required to suit any specific window. It will be appreciated that, depending upon the size of the window and the length of the members 52, it may not be necessary to cut any of the members 52.

The moisture drainage operates in the same manner as described with reference to the embodiment shown in Figure 1.

In Figure 11 another embodiment of the moisture drain is generally designated 100. It can be disposed in a window in the same way as the moisture drain shown in Figures 6 to 9.

The moisture drain 100 comprises an elongate channel-shaped member 102, a left hand end member 104, a right hand end member 106, a drainage tube 108, a cover 110 and a support member 112.

The left and right hands referred to are the opposite to those shown in the drawings because they are taken from the point of view of a person facing the inside surface of the window frame looking at the moisture drain 100 after it has been installed.

The collection member 102 is substantially U-shaped and includes a flat surface 114 (which can be resiliently deformable) extending along one side thereof. In use, the surface 114 abuts an inner surface of a window pane (not shown), so that moisture running down the pane is collected in the collection member 102. A formation 116 extends along the opposite side of the collection member 102, and will be described further hereinbelow.

The left hand end member 104 comprises a support leg 118 with a U-shaped channel 120 secured thereto. A formation 122 extends around a lower portion of the U-shaped channel 120. The collection member 102 can be received snugly between the channel 120 and the formation 122, so that moisture collecting in the channel 120 can run onto the collection member 102. The end member 104 is provided with a recess (not shown) for receiving the left hand end of the formation 116.

The end member 106 comprises a support leg 124 with a U-shaped channel 126 secured thereto. A drainage formation 128 extends around a lower portion of the U-shaped channel 126. A drainage aperture 130 is provided in the formation 128 and has a tube 132 depending downwardly therefrom. The drainage tube 108 is received within the tube 132 and is a snug fit therewith.

The collection member 102 is received between the channel 126 and the formation 128, and has an aperture (not shown) through which moisture in the channel 102 can drain to the aperture 130.

The end member 104 is provided with a recess 134 which receives the right hand end of the formation 116.

In use the drainage tube is disposed in the aperture in the window frame (not shown) in the way shown in Figures 6 to 9.

The support member 112 comprises a base 136 with an upstanding support formation 138. A slot 140 is provided in the base 136 through which fixing means in the form of a nail or screw (not shown) can be passed in order to secure the base 136 to the window frame.

The support formation 138 is provided with a plurality of parallel recesses 142 arranged vertically one above the other. Each recess is adapted to receive the formation 116 in order to provide additional support for the collection member 102.

The plurality of support positions provided by the support formation 138 is very useful because the collection member slopes downwardly from the left hand end to the right hand end; thus, the provision of a plurality of support positions enables the support member 112 to be positioned at the optimum position relative to the collection member 102.

The cover 110 extends over the support member 112, the end members 104 and 106, and the collection member 102, in order to hide these components from view. The bottom edge of the cover 110 is, in use, spaced slightly from the frame to allow the escape of any moisture which might pass between the window pane and the channel 102.

The moisture drain according to the invention may be adapted for use with conventional drainage systems where the moisture is drained between the window and the frame.

second bore hole extending generally upwardly from the first bore hole to the interior side of the building structure.

8. A method according to Claim 7, wherein the moisture collection means is in fluid communication with the or each second bore hole.

9. A moisture drain for a window structure, comprising an elongate collection member adapted to extend at least partially along a window frame with a part thereof in engagement with the pane so that moisture flowing down the pane flows into the collection member, said collection member having at least one aperture in fluid communication with a drainage member adapted to drain the moisture from one side of the pane to the other.

10. A moisture drain according to Claim 9, wherein the collection member is channel shaped.

11. A moisture drain according to Claim 9 or 10, wherein the pane-engaging part of the collection member is resiliently deformable so that said part can be biased into engagement with the pane.

12. A moisture drain according to Claim 9,10 or 11, wherein at least one support member is provided, the or each support being adapted to support a respective one of the or each collection member at a position above the frame.

13. A moisture drain according to Claim 12, wherein the or each support member and a respective one of the or each collection member are adapted to co-operate with one another to enable them to be secured together.

14. A moisture drain according to Claim 13, wherein the or each support member and said respective one of the or each collection member are a snap-fit.

15. A moisture drain according to Claim 12, wherein each collection member is integral with its respective support member or support members.

16. A moisture drain according to Claim 13, 14, or 15, wherein at least one support member is provided with an aperture which can be aligned with a respective one of the or each aperture in the or each collection member.

17. A moisture drain according to Claim 6, wherein said at least one support member is provided with a tube extending downwardly from the support member aperture, said tube being adapted to be received by the drainage member.

18. A moisture drain according to Claim 12, wherein the or each support member is adapted to be positioned at any desired position along the length of the or each collection member.

19. A moisture drain according to Claim 18, wherein the or each support member is provided with a plurality of supporting positions, whereby the or each collection member can be supported at a selected one of a plurality of different levels.

20. A moisture drain according to Claim 19, wherein the supporting positions are provided by a plurality of substantially parallel elongate recesses and the or each collection member is provided with an edge formation adapted to be received in a selected one of said recesses.

21. A moisture drain according to any of Claims 9 to 20, wherein the or each collection member is provided with a base which slopes downwardly towards the or each